

1 / 1

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Virtual vehicle sensors based on neural networks trained using data generated by simulation models

(EP-877309)

Virtuelle Fahrzeugsensoren auf der Basis neuronaler Netze, die mittels durch Simulationsmodelle erzeugter Daten angelehrt werden

(EP-877309)

A virtual vehicle sensor includes a neural network which produces a sensor output based on a linear combination of non-linear physical signals generated by conventional physical sensors. Instead of determining an output directly, the neural network determines the polynomial coefficients as functions of the physical signals indicative of other engine operating parameters. The sensor is manufactured using relatively limited data collection to calibrate a simulation model. The output of the simulation model is used for model-based mapping to generate more comprehensive maps used for training the neural network. The trained neural network is embedded in a controller and acts as the virtual sensor to monitor engine parameters which are difficult to measure or for which conventional physical sensors do not currently exist. The virtual sensor may be used to sense parameters such as in-cylinder residual mass fraction, emission levels, in-cylinder pressure rise during combustion, and exhaust gas temperature.

<IMAGE>

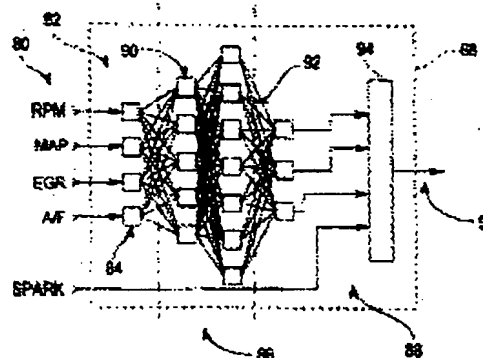


Fig. 2

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Page 2 sur 2

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